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# ***GALLARDO & ASSOCIATES, INC.***

P.O. Box 430, Santa Rosa, CA 95402  
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**Environmental and Geological Services**

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***We solve the problem!***

September 22, 2005

Ms. Minnie Corbit  
4675 Dywalt Road  
Sebastopol, CA 95472  
(707) 823-4574

**Job No. 016.98**

**Subject: DEEP WELL GROUNDWATER MONITORING WELL INSTALLATION  
REPORT FOR THE CORBIT SITE LOCATED AT: 3880 Gravenstein  
Highway, Sebastopol, California**

Dear Mrs. Corbit:

***Gallardo & Associates, Inc.*** is pleased to submit the enclosed report for the following location: **3880 Gravenstein Highway, Sebastopol, California**

Soil and groundwater samples were collected from Groundwater monitoring wells DW-1 through DW-3 for the purpose of evaluating the vertical extent of the impacted groundwater beneath the site.

***Gallardo & Associates, Inc.*** understands that you will submit a copy of this report to SCEHD for their review and approval.

If you have any questions in regard to this report, please contact us at (707) 537-2292.

Respectfully,

***Gallardo & Associates, Inc.***

***Rafael L. Gallardo***  
***President/Registered Geologist***

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**DEEP WELL GROUNDWATER MONITORING WELL INSTALLATION REPORT**  
**for**  
**3880 GRAVENSTEIN HIGHWAY**  
**SEBASTOPOL, CALIFORNIA**

**PREPARED FOR:**  
**Mrs. Minnie Corbit, Owner**  
**4675 Dywalt Road**  
**Sebastopol, California 95472**

**SUBMITTED TO:**  
**Ms. Peggy Carr**  
**Sonoma County Department of Health Services**  
**Environmental Health Division**  
**475 Aviation Blvd., Suite 220**  
**Santa Rosa, CA 95403**

**PREPARED BY:**  
**Rafael L. Gallardo**

***Rafael L. Gallardo, President/Project Geologist, R. G. No. 6834***

**GALLARDO & ASSOCIATES, INC., PROJECT NO. 016A.98**

**September 22, 2005**

## **TABLE OF CONTENTS**

<b>TABLE OF CONTENTS</b>	<b>I</b>
<b>1.0 EXECUTIVE SUMMARY</b>	<b>1</b>
<b>2.0 SITE HISTORY</b>	<b>5</b>
2.1 Site Location and Description	5
2.2 Previous Work and Site Conditions	5
2.3 Site Conceptual Model	11
2.3.1 Soil Model	11
2.3.2 Groundwater Model	11
<b>3.0 GEOLOGY AND HYDROGEOLOGY</b>	<b>12</b>
3.1 Geology and Regional Setting	12
3.2 Site Geology	12
3.3 Hydrogeology	12
<b>4.0 SCOPE OF WORK</b>	<b>13</b>
<b>5.0 DRILLING</b>	<b>13</b>
<b>6.0 SITE SOILS</b>	<b>13</b>
<b>7.0 SOIL SAMPLING</b>	<b>14</b>
<b>8.0 WELL CONSTRUCTION</b>	<b>14</b>
<b>9.0 GROUNDWATER SAMPLING</b>	<b>15</b>
<b>10.0 SUMMARY OF ANALYTICAL RESULTS</b>	<b>15</b>
10.1 Soil Analytical Results	15
10.2 Groundwater Analytical Results	15
<b>11.0 CONCLUSIONS</b>	<b>16</b>
<b>12.0 RECOMMENDATIONS</b>	<b>16</b>
<b>13.0 LIMITATIONS</b>	<b>17</b>
<b>14.0 REFERENCES CITED</b>	<b>17</b>
14.1 Geological References	18

## **APPENDICES**

**APPENDIX A - DRILLING LOGS, CROSS SECTIONS,  
AND WELL SURVEY DATA**

**APPENDIX B - LABORATORY ANALYTICAL DATA**

## **FIGURES**

**FIGURE 1 SITE LOCATION MAP ..... 4**  
**FIGURE 2 SITE MAP ..... 5**

## **TABLES**

**TABLE 1 SOIL ANALYSIS RESULTS ..... 15**  
**TABLE 2 GROUNDWATER ANALYSIS RESULTS ..... 15**

## 1.0 EXECUTIVE SUMMARY

From June 13 through June 17, 2005, **Gallardo & Associates, Inc.** advanced three deep exploratory soil borings to an approximate depth of between 45 and 51 ½ feet below grade surface (bgs) at the former Highgrade Towing/Dismantling site located at 3880 Gravenstein Highway in Sebastopol, California, (See **Figure 1 for Site Location Map**). The three borings were converted into two-inch diameter, 45-foot deep groundwater monitoring wells. The purpose of this investigation was to evaluate the condition of the first water-bearing zone below the water table, which is addressed in **Section 2.3.2** and entitled **Groundwater Model**. This evaluation presents the proposed work outlined in the workplan submitted to the Sonoma County Department of Health Services Environmental Health Division (SCEHD) by **Gallardo & Associates, Inc.** dated April 27, 2005. (See **attached Figure 2 for Borehole Location Map**).

A total of one soil sample was collected along with three water samples for laboratory analysis. The selected soil sample was analyzed for the following petroleum constituents: total petroleum hydrocarbons as diesel (**TPH-d**), total petroleum hydrocarbons as gasoline (**TPH-g**), and the fuel constituents benzene, toluene, ethylbenzene, and xylenes (**BTEX**). The water samples were analyzed for 1,2-Dibromoethane, (**EDB**), 1,2-Dichloroethane, (**DCA**), total petroleum hydrocarbons as gasoline (**TPH-g**), the fuel constituents benzene, toluene, ethylbenzene, and xylenes (**BTEX**) using EPA Method 8015/8020, and the fuel Oxygenates Di-isopropyl Ether (**DIPE**), Ethyl tert-Butyl Ether (**ETBE**), Methyl tert-Butyl Ether (**MTBE**), tert- Amyl Methyl Ether (**TAME**), and tert-Butanol (**TBA**). The analytical results are summarized in **Tables 1, 2, and 2A**.

*Based on the data collected during this investigation, **Gallardo & Associates, Inc.** concludes the following:*

*During this recent investigation an impacted soil zone was detected beneath exploratory soil boring/groundwater monitoring well DW-1 between a depth of one to 13 feet bgs. The impacted soil was detected near the former UST tank cavity located in front of the existing building.*

*Based on this investigation, it would appear that both the vertical and lateral extent of the impacted soil has been defined and is located between wells MW-2 and MW-3, up to the end of the northeast corner of the building. If this area is excavated it is likely that the soil plume can be remediated quickly.*

*The perched water table has been defined once again and flows through the site from an upgradient direction located northeast of the site and flows through the building in a southern direction. However, it appears to be seasonal and does not appear to pose a threat to the area during the summer and fall seasons. However, during the winter and spring, it appears to flow through the impacted shallow soil area located at the front of the building. The perched zone detected during this investigation ranged in thickness from approximately one to two feet.*

*The vertical extent of the groundwater plume may not have been detected during this investigation and appears to extend beyond a depth of 51 feet bgs. The impact extends into the bedrock which consists of a highly weathered and fractured Sandstone. However, the lateral extent of the lower*

*water zone impact appears to be confined to the area around well DW-1. The lower water zone appears to be under a semi-confined state, meaning that the water-bearing formation may not be completely confined and may be in contact with the upper water table zone. Further evaluation of this premise must be conducted in order to prove this evaluation.*

***Gallardo & Associates, Inc.** recommends the excavation of the shallow and deeper impacted soil from the area between wells MW-2 and MW-3, and along the front up to the northeast corner of the existing building. Excavation of the impacted soil located along the front of the building should be limited to a depth of approximately nine feet bgs, (former UST cavity). Monitoring well MW-3 will need to be removed and replaced once the shallow impacted soil has been removed. Groundwater monitoring wells MW-2, MW-3, and MW-7 are no longer necessary to monitor the groundwater. The remaining wells are sufficient enough to cover the area until site closure and therefore, should be destroyed at the same time as well MW-3.*

## 2.0 SITE HISTORY

### 2.1 Site Location and Description

The site is located at 3880 Gravenstein Highway in Sebastopol, California (See **Figure 1**). The property is bordered by Gravenstein Highway to the north, Hessel Road to the west, a commercial property to the east, and other properties to the south. The site property is owned by Ms. Minnie Corbit who is currently leasing the building to a restaurant and bar equipment company called Dolce Neve. The site area is approximately 1 ½ acres in size, slopes gently to the southwest and is covered by gravel, natural ground, and concrete. The regional topography consists of rolling hills and farm land (See **Figure 2**).

### 2.2 Previous Work and Site Condition

The project site was formally a garage and auto dismantling yard call *Corbit's Garage and Wrecking*. In 1993, PES was retained by Ms. Corbit to perform a soil and groundwater investigation at the site. Ms. Corbit informed PES that a third UST might be buried adjacent to the northeast corner of the building. However, a search for the third UST was not performed during the investigation.

On August 27, 1993, the Sonoma County Department of Health Services Environmental Health Division (SCDHSEHD) received a report entitled *Soil and Groundwater Investigation 3880 Gravenstein Highway South Sebastopol, California (PES, August 25, 1993)*. The investigation included the drilling of five soil borings to depths between 25 and 35 feet below grade surface (bgs). Three of the soil borings were converted into two-inch diameter groundwater monitoring wells of various depths (MW-1 to 35 feet bgs, MW-2 to 25 feet bgs, and MW-3 to 25 feet bgs). In their report, PES presented soil results from their investigation revealing concentrations of total petroleum hydrocarbons as TPH-g ranging between < 1 part per million (ppm) to 80 ppm, and the fuel constituent Benzene ranging between < 0.005 ppm to 0.35 ppm. Tables presenting groundwater sampling results revealed TPH-g concentrations ranging between 50 parts per billion (ppb) to 2,400 ppb, and Benzene concentrations ranging between < 0.5 ppb to 140 ppb in the groundwater samples beneath the site. PES recommended the removal of hydrocarbon-affected soil from the site, and an additional investigation to evaluate the lateral extent of the impacted groundwater beneath the property.

On January 30, 1998, *Gallardo & Associates* was retained by Ms. Corbit to perform one round of groundwater sampling of the three groundwater monitoring wells at the site. In January 1998, *Gallardo & Associates* submitted a report entitled 1998 *First Quarterly Groundwater Monitoring Report*. *Gallardo & Associates* concluded that one of the three existing monitoring wells (MW-3) revealed an increasing trend in TPH-g and Benzene concentrations and a decreasing trend in TPH-g and Benzene concentrations in wells MW-1 and MW-2. *Gallardo & Associates* recommended continued monitoring of the three monitoring wells to evaluate trends in the direction of groundwater flow beneath the site, additional borings and groundwater monitoring wells to determine the lateral and vertical extent of the soil and groundwater plumes beneath the property, and a Sensitive Receptor Survey (SRS) to evaluate risks of the impacted groundwater on human health and the environment in the area of the site.







On April 15, 1998, *Gallardo & Associates* submitted a workplan to Sonoma County Environmental Health Division (SCEHD). The workplan was approved by Ms. Elenor Raltiff in a letter dated May 1, 1998.

On June 26, 1998, *Gallardo & Associates* collected groundwater samples from the three existing monitoring wells. *Gallardo & Associates* concluded that the analytical results indicated increasing concentrations of benzene and tert-butanol in monitoring well MW-3, while monitoring well MW-1 revealed concentrations below the laboratory reporting limits (non-detectable/ND) for TPH-g, BTEX, and the Fuel Oxygenates. *Gallardo & Associates* recommended continued monitoring of the three monitoring wells to evaluate trends in the direction of groundwater flow beneath the site, additional borings and groundwater monitoring wells to determine the lateral and vertical extent of the soil and groundwater plumes beneath the property, and a Sensitive Receptor Survey (SRS) to evaluate risks of the impacted groundwater on human health and the environment in the area of the site. *Gallardo & Associates* submitted a report entitled *1998 Second Quarter Groundwater Sampling Results for Three Groundwater Monitoring Wells at 3880 Gravenstein Highway in Sebastopol, California, dated August 30, 1998*.

On October 19 and 20, 1998, *Gallardo & Associates* advanced four exploratory soil borings to an approximate depth of between 15 and 21 feet below grade surface (bgs). The borings were converted into two-inch diameter groundwater monitoring wells (MW-4, MW-5, MW-6, and MW-7). Based on the data collected during the investigation, *Gallardo & Associates* concluded that during the investigation no evidence of petroleum hydrocarbons was detected in the soil samples collected from the four exploratory soil borings/monitoring wells. Based on this information, it appeared that the horizontal and vertical extent of the petroleum impacted soil beneath the site property had been defined; however, the groundwater had been impacted beneath well MW-6 by petroleum fuel hydrocarbons in the form of 1,2-DCA at 2.2 ppb. Additional wells may be required south and east of MW-6 in order to evaluate the chlorinated solvents detected in the groundwater. Because petroleum fuel hydrocarbons were detected in the groundwater, additional groundwater sampling events would be needed at the site. *Gallardo & Associates* recommended that Groundwater monitoring wells MW-4, MW-5, MW-6, and MW-7 should be purged and sampled along with the three existing wells during the next scheduled groundwater sampling event. All of the existing groundwater monitoring wells should be sounded and the groundwater levels measured monthly during each quarter. The direction of groundwater flow and the hydraulic gradient should be calculated and evaluated on a monthly basis to evaluate seasonal fluctuations in groundwater depths and flow directions. The drilling and installation of additional monitoring wells for the purpose of evaluating the vertical and horizontal extent of the impacted groundwater south and west of well MW-6 would be needed, however, an additional episode of groundwater monitoring should be conducted prior to the installation of these wells. *Gallardo & Associates, Inc.* submitted a report entitled *Monitoring Well Installation Report at 3880 Gravenstein Highway in Sebastopol, California, dated January 19, 1999*.

On October 28, 1998, *Gallardo & Associates* collected groundwater samples from seven monitoring wells. *Gallardo & Associates* concluded that well MW-3 revealed an increase in TPH-g, TEX, and Tert-Butanol concentrations. 1,2 DCA was also detected in both MW-2 at 2.2 ppb and MW-3 at 9.3 ppb. A groundwater depression was detected beneath the site property revealing groundwater flows in three directions (southeast, northeast, and southwest). *Gallardo & Associates*

recommended continued monitoring of the seven monitoring wells to evaluate trends in the direction of groundwater flow beneath the site. Additional borings and groundwater monitoring wells to determine the lateral and vertical extent of the soil and groundwater plumes beneath the property, and a Sensitive Receptor Survey (SRS) were also recommended. *Gallardo & Associates* submitted a report entitled *1998 Fourth Quarter Groundwater Sampling Results for Seven Groundwater Monitoring Wells at 3880 Gravenstein Highway in Sebastopol, California, dated January 5, 1999*.

On June 23, 1999, *Gallardo & Associates, Inc.* collected groundwater samples from seven monitoring wells. *Gallardo & Associates, Inc.* concluded that wells MW-1 through MW-7 revealed a decreasing trend for analites tested that quarter; however, well MW-3 revealed a slight increase in benzene and well MW-5 revealed a trace of TBA at 30 ppb. The groundwater depression observed in the October 1998 monitoring report revealed a southeast directional flow, (nose facing northwest) whereas the June 1999 depression revealed an east directional flow (nose facing east). *Gallardo & Associates, Inc.* recommended continued monitoring of the seven monitoring wells to evaluate trends in the direction of groundwater flow beneath the site and performing a Sensitive Receptor Survey (SRS). *Gallardo & Associates, Inc.* submitted a report entitled *1999 Second Quarter Groundwater Sampling Results for Seven Groundwater Monitoring Wells at 3880 Gravenstein Highway in Sebastopol, California, dated July 30, 1999*.

On June 28, 2000, *Gallardo & Associates, Inc.* collected groundwater samples from seven monitoring wells. *Gallardo & Associates, Inc.* concluded that Comparisons of past and current analytical results for wells MW-1 through MW-7 indicated a decreasing trend in petroleum fuel hydrocarbons; however, well MW-3 revealed a slight increase in TPH-g and a slight decrease in benzene. Well MW-6 revealed a trace of 1,2 DCA at 1.3 ppb. In addition, well MW-3 revealed an increase in TBA at 140 ppb. The groundwater depression observed in both the October 1998 and June 1999 monitoring reports revealed a southeast directional flow, (nose facing northwest) and an east directional flow (nose facing east), respectively. However, the June 2000 groundwater flow direction revealed a southwest directional flow. *Gallardo & Associates, Inc.* recommended continued monitoring of the seven monitoring wells to evaluate trends in the direction of groundwater flow beneath the site and performing a Sensitive Receptor Survey (SRS). *Gallardo & Associates, Inc.* submitted a report entitled *2000 Second Quarter Groundwater Sampling Results for Seven Groundwater Monitoring Wells at 3880 Gravenstein Highway in Sebastopol, California, dated October 20, 2000*.

On September 20, 2000 *Gallardo & Associates, Inc.* collected groundwater samples from seven monitoring wells. *Gallardo & Associates, Inc.* concluded that comparisons of past and current analytical results for wells MW-1 through MW-7 indicated a decreasing trend in petroleum fuel hydrocarbons; however, well MW-3 revealed an increase of 1,2 DCA at 14 ppb, while well MW-6 revealed a slight decrease of 1,2 DCA at 1.2 ppb. Groundwater flow for the period was to the southwest with the nose of the depression trending northeast *Gallardo & Associates, Inc.* recommended the following: additional episodes of quarterly groundwater sampling of the seven monitoring wells to evaluate trends in gasoline hydrocarbon concentrations in the groundwater beneath the site; completion of the Sensitive Receptor Survey (SRS); drilling of additional groundwater monitoring wells adjacent to the concrete building pad and building, and one between the existing domestic well and MW-6, and one within the building; and sampling of the domestic well, if possible. *Gallardo & Associates, Inc.* submitted a report entitled *2000 Third Quarter Groundwater Sampling Results for Seven Groundwater Monitoring Wells at 3880 Gravenstein*

***Highway in Sebastopol, California, dated October 28, 2000.***

On December 7, 2000, ***Gallardo & Associates, Inc.*** collected groundwater samples from seven monitoring wells. ***Gallardo & Associates, Inc.*** concluded that comparisons of past and current analytical results for wells MW-1 through MW-7 revealed no change in the concentration amounts of petroleum fuel hydrocarbons in the groundwater for the quarter; however, wells MW-2 and MW-3 revealed increasing concentrations of TBA, TPH-g, and BTEX. TBA was detected for the first time in well MW-2. The groundwater depression observed during the period matched the October 1998 sampling event, both revealed a southeast directional flow, (nose facing northwest). ***Gallardo & Associates, Inc.*** recommended the following: additional episodes of quarterly groundwater sampling of the seven monitoring wells to evaluate trends in gasoline hydrocarbon concentrations in the groundwater beneath the site; completion of the Sensitive Receptor Survey (SRS); drilling of additional groundwater monitoring wells adjacent to the concrete building pad and building, and one between the existing domestic well and MW-6, and one within the building; and sampling of the domestic well, if possible. ***Gallardo & Associates, Inc.*** submitted a report entitled ***2000 Fourth Quarter Groundwater Sampling Results for Seven Groundwater Monitoring Wells at 3880 Gravenstein Highway in Sebastopol, California***, dated March 20, 2001.

On March 27, 2001, ***Gallardo & Associates, Inc.*** collected groundwater samples from seven monitoring wells. ***Gallardo & Associates, Inc.*** concluded that comparisons of past and current analytical results for wells MW-1 through MW-7 revealed no change in the concentration amounts of petroleum fuel hydrocarbons in the groundwater for the quarter; however, well MW-2 revealed a slight increase in toluene at 0.80 ppb, and well MW-3 revealed an increase in benzene at 30 ppb. The groundwater for the March sampling event revealed a south-southwest general flow direction. ***Gallardo & Associates, Inc.*** recommended the following: additional episodes of quarterly groundwater sampling of the seven monitoring wells to evaluate trends in gasoline hydrocarbon concentrations in the groundwater beneath the site; completion of the Sensitive Receptor Survey (SRS); drilling of additional groundwater monitoring wells adjacent to the concrete building pad and building, and one between the existing domestic well and MW-6, and one within the building; and sampling of the domestic well, if possible. ***Gallardo & Associates, Inc.*** submitted a report entitled ***2001 First Quarter Groundwater Sampling Results for Seven Groundwater Monitoring Wells at 3880 Gravenstein Highway in Sebastopol, California***, dated May 28, 2001.

On June 7, 2001, ***Gallardo & Associates, Inc.*** collected groundwater samples from seven monitoring wells. ***Gallardo & Associates, Inc.*** concluded that comparisons of past and current analytical results for wells MW-1 through MW-7 revealed no change in the concentration amounts of petroleum fuel hydrocarbons in the groundwater for the quarter; however, well MW-2 revealed a slight increase in benzene at 5.6 ppb, and well MW-3 revealed an increase in TPH-g at 4,000, benzene at 210 ppb, and TEX. The groundwater flow for the period revealed a south-southwest general flow direction. ***Gallardo & Associates, Inc.*** recommended the following: additional episodes of quarterly groundwater sampling of the seven monitoring wells to evaluate trends in gasoline hydrocarbon concentrations in the groundwater beneath the site; completion of the Sensitive Receptor Survey (SRS); drilling of additional groundwater monitoring wells adjacent to the concrete building pad and building, and one between the existing domestic well and MW-6, and one within the building; and sampling of the domestic well, if possible. ***Gallardo & Associates, Inc.*** submitted a report entitled ***2001 Second Quarter Groundwater Sampling Results for Seven Groundwater Monitoring Wells at 3880 Gravenstein Highway in Sebastopol, California***, dated May 28, 2001.

On September 14, 2001, *Gallardo & Associates, Inc.* collected groundwater samples from seven monitoring wells. *Gallardo & Associates, Inc.* concluded that comparisons of past and current analytical results for wells MW-1 through MW-7 revealed a change in the concentration amounts of petroleum fuel hydrocarbons in the groundwater for the quarter in the following wells: MW-2 revealed an increase in TPH-g and Benzene, while MW-3 revealed a dramatic decrease in TPH-g concentrations (from 4,000 ppb down to 650 ppb) and a decrease in benzene concentrations (from 210 ppb down to 150 ppb). The groundwater for the third quarter period revealed a southwest general flow direction. *Gallardo & Associates, Inc.* recommended additional episodes of quarterly groundwater sampling of the seven monitoring wells, additional groundwater monitoring wells (one adjacent to the concrete building pad and building, one between the existing domestic well and MW-6, and one within the building), and sampling of the domestic well, if possible. *Gallardo & Associates, Inc.* submitted a report entitled *2001 Third Quarter Groundwater Sampling Results for Seven Groundwater Monitoring Wells at 3880 Gravenstein Highway in Sebastopol, California*, dated September 17, 2001.

On November 19, 2001, *Gallardo & Associates, Inc.* collected groundwater samples from seven monitoring wells. *Gallardo & Associates, Inc.* concluded that the past and current analytical results for wells MW-1, MW-4, MW-5, MW-6 and MW-7 revealed a change in the concentration amounts of petroleum fuel hydrocarbons in the groundwater for the quarter in the following wells: MW-2 revealed a decrease in TPH-g and Benzene, while MW-3 revealed an increase in TPH-g concentrations (from 650 ppb up to 8,800 ppb), benzene concentrations (from 150 ppb up to 170 ppb), and TBA concentrations from ND up to 62 ppb. The groundwater reversed direction from a southwest flow to a southeast general flow direction. It was thought that impacted soil remained beneath the site property adjacent to well MW-3. Delineation and removal of the impacted soil was proposed in order to reduce the impact to the groundwater. *Gallardo & Associates, Inc.* recommended additional episodes of quarterly groundwater sampling of the seven monitoring wells and the installation of additional groundwater monitoring wells: one adjacent to the concrete building pad and building, one between the existing domestic well and MW-6, and one within the building, downgradient of well MW-3. Also, additional exploratory soil borings to evaluate the extent of the underlying impacted soil beneath and around well MW-3. And finally, sampling of the domestic well, if possible. *Gallardo & Associates, Inc.* submitted a report entitled *2001 Fourth Quarter Groundwater Sampling Results for Seven Groundwater Monitoring Wells at 3880 Gravenstein Highway in Sebastopol, California*, dated November 29, 2001.

On March 13, 2002, *Gallardo & Associates, Inc.* collected groundwater samples from nine monitoring wells. *Gallardo & Associates, Inc.* concluded that the current analytical results for wells MW-1, through MW-9 revealed no significant changes in the concentration amounts of petroleum fuel hydrocarbons in the groundwater for the quarter with the exception of well MW-3, which revealed a dramatic decrease in the TPH-g and Benzene concentrations within the monitoring well. However, there was an increase in the concentration amount of TBA. This was likely due to the recent change in the screening interval for MW-3. *Gallardo & Associates, Inc.* recommended additional episodes of quarterly groundwater sampling of the nine monitoring wells. *Gallardo & Associates, Inc.* submitted a report entitled *2002 First Quarter Groundwater Sampling Results for Seven Groundwater Monitoring Wells at 3880 Gravenstein Highway in Sebastopol, California*, dated April 30, 2002.



On June 5, 2002, *Gallardo & Associates, Inc.* collected groundwater samples from nine monitoring wells. *Gallardo & Associates, Inc.* concluded that the analytical results for wells MW-1 through MW-9 revealed no significant changes in the concentration amounts of petroleum fuel hydrocarbons in the groundwater for the quarter with the exception of well MW-3, which continued to reveal decreasing concentrations of TBA, TPH-g and Benzene. Groundwater flow was to the west-southwest with an average hydraulic gradient of approximately 0.02 ft/ft. *Gallardo & Associates, Inc.* recommended additional episodes of quarterly groundwater sampling of the nine monitoring wells. *Gallardo & Associates, Inc.* submitted a report entitled *2002 Second Quarter Groundwater Sampling Results for Seven Groundwater Monitoring Wells at 3880 Gravenstein Highway in Sebastopol, California*, dated June 20, 2002.

On November 22, 2002, *Gallardo & Associates, Inc.* collected groundwater samples from nine monitoring wells. *Gallardo & Associates, Inc.* concluded that the analytical results for wells MW-1 through MW-9 revealed no significant changes in the concentration amounts of petroleum fuel hydrocarbons in the groundwater for the quarter with the exception of well MW-3, which continued to reveal decreasing concentrations of TBA, TPH-g, and Benzene concentrations. Groundwater flow was again to the west-southwest with an average hydraulic gradient of approximately 0.08 ft/ft. *Gallardo & Associates, Inc.* recommended additional episodes of quarterly groundwater sampling of the nine monitoring wells. *Gallardo & Associates, Inc.* submitted a report entitled *2002 Third Quarter Groundwater Sampling Results for Seven Groundwater Monitoring Wells at 3880 Gravenstein Highway in Sebastopol, California*, dated September 15, 2002.

*Gallardo & Associates, Inc.* submitted a report entitled *2002 Fourth Quarter Groundwater Sampling Results for Seven Groundwater Monitoring Wells at 3880 Gravenstein Highway in Sebastopol, California*, dated January 30, 2003.

*Gallardo & Associates, Inc.* submitted a report entitled *2003 First Quarter Groundwater Sampling Results for Seven Groundwater Monitoring Wells at 3880 Gravenstein Highway in Sebastopol, California*, dated March 5, 2003.

*Gallardo & Associates, Inc.* submitted a report entitled *2003 Second Quarter Groundwater Sampling Results for Seven Groundwater Monitoring Wells at 3880 Gravenstein Highway in Sebastopol, California*, dated July 2, 2003.

*Gallardo & Associates, Inc.* submitted a report entitled *2003 Third Quarter Groundwater Sampling Results for Seven Groundwater Monitoring Wells at 3880 Gravenstein Highway in Sebastopol, California*, dated September 5, 2003.

*Gallardo & Associates, Inc.* submitted a report entitled *2003 Fourth Quarter Groundwater Sampling Results for Seven Groundwater Monitoring Wells at 3880 Gravenstein Highway in Sebastopol, California*, dated January 25, 2004.

## 2.3 Site Conceptual Model

### 2.3.1 Soil Model

The site soils consist of brown to greyish brown sands to an approximate depth of between three and seven feet bgs. The underlying layer consists of a yellow-brown clayey sand containing small seams

of sandy clay, however, the seams are consistent and appeared to be connected to a three-foot thick bed of sandy clay detected beneath well MW-7. The bottom most bed consists of a yellow-brown

clayey sand to brown sand to a depth of approximately 21 feet bgs. No petroleum odor or discoloration were detected in the encountered soil profile, however, trace amounts of 1,2-Dichloroethane (DCA) were detected in the groundwater sample collected from well MW-6 located downgradient of the former UST cavity. A petroleum odor was detected from between approximately four to eight feet bgs in borings GA-1 through GA-4 located towards the front of the site property. ***The highest impacted soil concentrations detected at the site were, (TPH-g @ 13,000 ppm and benzene @ 27 ppm) located between a depth of approximately 6 to 6 ½ feet bgs. The vertical and horizontal extent of the impacted soil plume appears to be defined and contained within the site property.***

### 2.3.2 Groundwater Model

Depending on the season, shallow groundwater beneath the site is generally encountered at a depth of between approximately 1 ½ and eight feet bgs. The site contains nine groundwater monitoring wells, one drilled to approximately 14 ½, four drilled to a depth of approximately 20 feet bgs, three to 25 feet bgs, and one to 35 feet bgs. Based on the water measurements collected over the years from all of the existing groundwater monitoring wells located at the site property and boring cross sections, groundwater beneath the site appears to be in a confined to semi-confined state. A perched water zone was also detected at a depth of approximately 1 ½ feet bgs and ending at a depth of between 3 ½ feet to five feet bgs. The perched water zone was also detected during the decommissioning of well MW-3 and had a strong gasoline odor when encountered. The perched water zone appears to have been impacted by petroleum fuel hydrocarbons and needs to be defined and sampled. In addition, no deep water borings (> 50 feet bgs) have been advanced on the site. ***The groundwater has been impacted by concentrations of TPH-g, BTEX, and the Fuel Oxygenate TBA. The highest concentrations detected at the site were TPH-g @ 8,800 ppb, Benzene @ 260 ppb, and TBA @ 370 ppb. In addition, the Chlorinated Solvent 1,2 DCA was detected at the site (14 ppb). The present concentrations are as follows: TPH-g @ 640 ppb, benzene @ 2.7 ppb, and TBA @ 85 ppb, 1,2 DCA @ 12 ppb. The horizontal extent of the impacted groundwater has been defined. The most current evaluation is presently evaluating the vertical extent of the impacted groundwater.***

### **3.0 GEOLOGY AND HYDROGEOLOGY**

#### **3.1 Geology and Regional Setting**

The project site is situated in the Coast Range geomorphic province of California. The Coast Range geomorphic province forms a physical province approximately 600 miles long by 50 miles wide, and consists of a number of mountain ranges oriented in a northwest trending direction. These mountain ranges are chiefly made up of late Jurassic and younger formations. The structure of these mountain ranges are basically controlled by folds and faults. The dominant formation of this province is the eugeosynclinal Franciscan complex of rocks of Jurassic-Cretaceous age. The region to the north and east of the project site was further developed by a series of Tertiary volcanic eruptions during the early to late Miocene period, which includes but is not limited to the Berkeley Volcanics, Sonoma Volcanics, and the Clear Lake Volcanics.

#### **3.2 Site Geology**

The site is situated along the boundary between the eastern side of the Sebastopol Block and the western side of the Santa Rosa Plain. The Sebastopol Block is a north-south trending structural block located west of the Santa Rosa Plain and consists of relatively flat lying Miocene and Pliocene marine sand deposits, minor conglomerate, and a widespread layer of pumice lapilli tuff. The site area is mapped by Fox, Jr. (1983) as Wilson Grove Formation (Tm) which consists of fine-grained unconsolidated sand, sandstone, minor amounts of gravel and tuff. The sandstone varies in color from grey to a pale yellowish orange. The residual soil consists of silty sand with clay. The Wilson Grove Formation was deposited under beach and shallow-marine conditions. Deposits of gravel and sand of alluvial origin blanket the marine deposits. The property is situated approximately 13 ½ miles east of the San Andreas Fault Zone and 4 ½ miles west of the Rodgers Creek Fault Zone. The San Andreas Fault Zone is considered active and has shown displacement during historic time (last 200 years), while the Rodgers Creek Fault Zone has shown displacement during Holocene time (last 10,000 years).

#### **3.3 Hydrogeology**

The property rests along the western border of the Santa Rosa Plain. This groundwater basin contains various water-yielding units within its boundaries, of which alluvial fan deposits and the Merced Formation form the major water-yielding units. The site is approximately 1/4 mile south of the Laguna De Santa Rosa a large fresh-water lagoon and probable recharge area within the Santa Rosa Plain. The groundwater basin, in general, is approximately in balance with increased groundwater levels in the northeast portion of the Santa Rosa Plain. Sea water intrusion is not a factor in this basin. The total thickness of the water-yielding materials range from 50 to 1,000 feet, with an average thickness of approximately 400 feet. The groundwater reservoir in the Santa Rosa Plain is extremely compartmental due to the discontinuity of the various water-yielding formations by high angle faulting and folding beneath the plain. Groundwater was initially encountered below the site in a previous investigation at an approximate depth of between 5 and 6 feet bgs (**PES August 25, 1993** ).



#### 4.0 SCOPE OF WORK

This report represents the work performed from June 13 to June 17, 2005 by *Gallardo & Associates, Inc.* The following actions were taken:

- Three deep exploratory soil borings were advanced to an approximate depth of between 45 and 51 ½ feet bgs.
- Because this was an evaluation of the vertical extent of the existing groundwater plume, only zones where impacted soil was encountered were sampled. A total of one soil sample was collected during the drilling of the three exploratory borings. The sample was prepared for submittal to a Certified analytical laboratory.
- The three exploratory soil borings were converted into 45-foot deep, two-inch diameter groundwater monitoring wells.
- The Selected soil sample was analyzed for total petroleum hydrocarbons as diesel (**TPH-d**), total petroleum hydrocarbons as gasoline (**TPH-g**), and the gasoline fuel constituents benzene, toluene, ethylbenzene, and xylenes (**BTEX**) by EPA Method 8015/8020.
- The soil cuttings were placed in 55-gallon D.O.T. approved drums, along with the rinse water and left on-site pending analytical results and remain the responsibility of the client, Mrs. Minnie Corbit for proper disposal.
- The conclusions and recommendations contained in this report were prepared by *Gallardo & Associates, Inc.* and are based on the laboratory data obtained during the drilling and sampling of exploratory soil borings/groundwater monitoring wells DW-1 through DW-3, Cross Sections, and previous site investigations conducted by *Gallardo & Associates, Inc.*

#### 5.0 DRILLING

On June 8, 2005, *Gallardo & Associates, Inc.* obtained a drilling permit from Sonoma County Environmental Health Division, (#4718) for the drilling of three groundwater monitoring wells to a depth of approximately 50 feet bgs. On June 13, 2005, *Gallardo & Associates, Inc.* arrived at the investigation site and proceeded with the drilling and placement of approximately 32 feet of 9 ¼-inch diameter Conductor Casing. The Conductor Casing was placed into the ground during the first two days of drilling and was allowed to cure for approximately two days before drilling through it and setting the groundwater monitoring wells. The three deep wells, (DW-1, DW-2, and DW-3) were advanced to an approximate depth of between 45 and 51 ½ feet bgs. However, all three monitoring wells were set at a depth of approximately 45 feet bgs using a CME 75 auger drill rig operated by Clearheart Drilling, LLC of Guerneville, California, a Certified C-57 licensed drilling company.

#### 6.0 SITE SOILS

The site soils encountered during drilling consisted of brown to greyish brown fill material, (sandy silty clay with iron debris) and sand, to a silty clay to a depth of between approximately 3 ½ feet to 12 feet bgs. From a depth of approximately seven feet to the bottom of the boring a clayey sand was

encountered. However, a 6 to 7 ½-foot thick clay zone was detected beneath wells DW-1 and DW-2 at an approximate depth of between 3 ½ and 14 feet bgs. Below a depth of approximately 14 feet, the soil profile varied between a clayey sand to sand to the bottom of the borehole. However, bedrock, (Sandstone) was encountered at a depth of approximately 20 feet bgs beneath well DW-1, **(See Cross Sections Located in Appendix A).**

## 7.0 SOIL SAMPLING

Because this was an evaluation of the vertical extent of the existing groundwater plume, only zones where impacted soil was encountered were sampled. A total of one soil sample was collected during the drilling of the three exploratory borings. The soil samples were collected using a two-foot long, 2-inch I.D. split-spoon sampler containing four, six-inch long brass tubes. The sampler was decontaminated before and after each use by using a Tri-Sodium Phosphate wash solution and tap water. The sampler was placed down the borehole and advanced approximately 18 inches into the soil using a 140 pound hammer. One of the four liners (usually the bottom liner), was covered at both ends with Teflon tape, and plastic caps for delivery to the analytical laboratory.

## 8.0 WELL CONSTRUCTION

*Gallardo & Associates, Inc.* constructed the three groundwater monitoring wells in the following manner:

A 12-inch diameter boring was drilled to a depth of between approximately 31 ½ to 32 feet bgs followed by the placement of 9 ¼-inch O.D. conductor casing to the aforementioned depths. An annular seal consisting of a bentonite/cement mixture with water was placed around the outside of the conductor casing from the bottom of the casing to within one-foot of grade surface to insure a water tight seal within the conductor casing. A large portion of the groundwater located within the inside of the casing was removed and stored in D.O.T approved 55-gallon drums. The conductor casing was checked periodically to insure that the casing was water tight. The conductor casing was left to cure for approximately two days. On the third day, the drill rig set eight-inch diameter hollow-stem augers down each of the conductor casings and commenced with the final drilling of the monitoring wells to approximately 45 feet bgs.

The two-inch diameter monitoring wells were constructed in the following manner:

Five feet of two-inch diameter 0.020 well screen attached to 40 feet of solid PVC well-casing was placed down each boring to a final depth of approximately 45 feet bgs. The filter pack consisting of No. 2/12 sand was then placed in the annular space between the 2-inch diameter casing, and the diameter of the borehole and was extend from the bottom of the well to approximately two-foot above the top of the screened casing, (38 to 45 feet bgs). A layer of bentonite approximately six-feet in thickness was placed above the filter pack up to the bottom of the conductor casing and charged with water. The remaining space was backfilled using a cement-bentonite grout mixture. A locking expandable cap was placed on top of each well casing, followed by a secured traffic-rated well box cover to protect it from surface traffic. The wells were surveyed on July 12, 2005 by *Virgil Chavez Land Surveying*, a State Certified land Surveying company.

## 9.0 GROUNDWATER SAMPLING

Approximately one week after completion, (June 23, 2005) the three wells were developed until the groundwater was visually clear and free of sediment and then sampled.

## 10.0 SUMMARY OF ANALYTICAL RESULTS

The one soil sample was analyzed for the following: **TPH-d**, **TPH-g**, and **BTEX**. The soil sample was collected on June 13, 2005.

Soil analytical reports are included in **Appendix B**.

### 10.1 Soil Analytical Results

The laboratory results for the June 23, 2005 soil sample collected from well DW-1 is summarized in **Table 1**.

**TABLE 1**  
Soil Results for 3880 Gravenstein Highway in Sebastopol, California

SAMPLE NUMBER	SAMPLE DEPTH (Feet)	TPH-d mg/kg	TPH-g mg/kg	Benzene mg/kg	Toluene mg/kg	Ethyl Benzene mg/kg	Xylenes mg/kg
DW-1-1	@ 9 Feet	610	2,500	7.2	24	14	110
#California Department of Health Services primary maximum contamination level for drinking water.		None Listed	None Listed	None Listed	None Listed	None Listed	None Listed

### 10.2 Groundwater Analytical Results

The laboratory results for the June 23, 2005 groundwater sampling are summarized in **Table 2**

**TABLE 2**  
Groundwater sampling results for  
3880 Gravenstein Highway in Sebastopol, California

BORING NUMBER	SAMPLE DATE	1,2-EDB ug/L	1,2 DCA ug/L	THP-d ug/L	TPH-g ug/L	Benzene ug/L	Toluene ug/L	Ethyl Benzene ug/L	Xylenes ug/L
DW-1	06/23/05	ND < 1.0	ND < 1.0	NT	5,700	110	340	160	790
DW-2	06/23/05	< 0.5	< 0.5	NT	110	2.2	8.0	2.8	17
DW-3	06/23/05	< 0.5	< 0.5	NT	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
*California Department of Health Services primary maximum contamination level for drinking water.		0.5		None Listed	None Listed	1.0	150	700	1,750

## 11.0 CONCLUSIONS

Based on the accumulated site history data, and the current groundwater investigation and results *Gallardo & Associates, Inc.* concludes the following:

- *During this recent investigation an impacted soil zone was detected beneath exploratory soil boring/groundwater monitoring well DW-1 between a depth of one to 13 feet bgs. The impacted soil was detected near the former UST tank cavity located in front of the existing building*
- *Based on this investigation, it would appear that both the vertical and lateral extent of the impacted soil has been defined and is located between wells MW-2 and MW-3, up to the end of the northeast corner of the building. If this area is excavated it is likely that the soil plume can be remediated quickly.*
- *The perched water table has been defined once again and flows through the site from an upgradient direction located northeast of the site and flows through the building in a southern direction. However, it appears to be seasonal and does not appear to pose a threat to the area during the summer and fall seasons. However, during the winter and spring, it appears to flow through the impacted shallow soil area located at the front of the building. The perched zone detected during this investigation ranged in thickness from approximately one to two feet.*
- *The vertical extent of the groundwater plume may not have been detected during this investigation and appears to extend beyond a depth of 51 feet bgs. The impact extends into the bedrock which consists of a highly weathered and fractured Sandstone. However, the lateral extent of the lower water zone impact appears to be confined to the area around well DW-1. The lower water zone appears to be under a semi-confined state, meaning that the water-bearing formation may not be completely confined and may be in contact with the upper water table zone. Further evaluation of this premise must be conducted in order to prove this evaluation.*

## 12.0 RECOMMENDATIONS

Based on the data reviewed, *Gallardo & Associates, Inc.* presents the following recommendations:

- *Excavation of the shallow and deeper impacted soil from the area between wells MW-2 and MW-3, and along the front up to the northeast corner of the existing building. Excavation of the impacted soil located along the front of the building should be limited to a depth of approximately nine feet bgs, (former UST cavity).*
- *Monitoring of the three deep wells for two more sampling events for the purpose of evaluating the condition of the lower water bearing zone.*
- *Continued quarterly monitoring of the existing groundwater monitoring wells as currently stipulated by SCEHD.*

### 13.0 LIMITATIONS

This report has been prepared in accordance with generally accepted environmental, geological and engineering practices. No warranty, either expressed or implied, is made as to the professional advice presented herein. The analysis, conclusions and recommendations contained in this report are based upon Cross Sections, and the current laboratory data collected from exploratory soil borings/groundwater monitoring wells DW-1 through DW-3 by *Gallardo & Associates, Inc.* The conclusions and recommendations presented in this report are professional opinions based solely upon Cross Sections, laboratory soil and groundwater testing of exploratory soil borings/groundwater monitoring wells DW-1 through DW-3. *Gallardo & Associates, Inc.* recognizes that the limited scope of services performed in the execution of this report may not be appropriate to satisfy the needs, or requirements of other state agencies, or of other users. Any use or reuse of this document or its findings, conclusions or recommendations presented herein is at the sole risk of said user.

### 14.0 REFERENCES CITED

*Soil and Groundwater Investigation 3880 Gravenstein Highway South Sebastopol, California* by PES Environmental, dated August 25, 1993.

*1998 First Quarterly Groundwater Monitoring Report*, by *Gallardo & Associates*, dated January 30, 1998.

*Workplan for a Limited Soil and Groundwater Investigation*, by *Gallardo & Associates*, dated April 15, 1998.

*Monitoring Well Installation Report at 3880 Gravenstein Highway in Sebastopol, California*, by *Gallardo & Associates, Inc.* dated January 19, 1999.

*1999 Second Quarterly Groundwater Monitoring Report*, by *Gallardo & Associates, Inc.*, dated July 30, 1999.

*2000 Second Quarterly Groundwater Monitoring Report*, by *Gallardo & Associates, Inc.*, dated October 20, 2000.

*2000 Third Quarterly Groundwater Monitoring Report*, by *Gallardo & Associates, Inc.*, dated October 28, 2000.

*2000 Fourth Quarterly Groundwater Monitoring Report*, by *Gallardo & Associates, Inc.*, dated March 20, 2001.

*2001 First Quarterly Groundwater Monitoring Report*, by *Gallardo & Associates, Inc.*, dated May 28, 2001.

*2001 Second Quarterly Groundwater Monitoring Report*, by *Gallardo & Associates, Inc.*, dated June 20, 2001.

*Sensitive Receptor Survey for the Minnie Corbit Site Located At: 3880 Gravenstein Highway, Sebastopol, California*. by *Gallardo & Associates, Inc.*, dated September 1, 2001.

*2001 Third Quarterly Groundwater Monitoring Report*, by *Gallardo & Associates, Inc.*, dated September 17, 2001.

*2001 Fourth Quarterly Groundwater Monitoring Report*, by *Gallardo & Associates, Inc.*, dated November 29, 2001.

*2002 First Quarterly Groundwater Monitoring Report*, by *Gallardo & Associates, Inc.*, dated April 30, 2002.

*2002 Second Quarterly Groundwater Monitoring Report*, by *Gallardo & Associates, Inc.*, dated June 20, 2002.

*2002 Third Quarterly Groundwater Monitoring Report*, by *Gallardo & Associates, Inc.*, dated September 15, 2002

*2002 Fourth Quarterly Groundwater Monitoring Report*, by *Gallardo & Associates, Inc.*, dated January 30, 2003.

*2003 First Quarterly Groundwater Monitoring Report*, by *Gallardo & Associates, Inc.*, dated March 5, 2003.

*2003 Second Quarterly Groundwater Monitoring Report*, by *Gallardo & Associates, Inc.*, dated September 5, 2003.

*2003 Third Quarterly Groundwater Monitoring Report* by *Gallardo & Associates, Inc.*, dated September 5, 2003.

*2003 Fourth Quarterly Groundwater Monitoring Report* by *Gallardo & Associates, Inc.*, dated January 25, 2004.

*2004 First Quarterly Groundwater Monitoring Report* by *Gallardo & Associates, Inc.*, dated February 15, 2004.

*2004 Second Quarterly Groundwater Monitoring Report* by *Gallardo & Associates, Inc.*, dated June 19, 2004.

*2004 Third Quarterly Groundwater Monitoring Report* by *Gallardo & Associates, Inc.*, dated September 20, 2004.

*2004 Fourth Quarterly Groundwater Monitoring Report* by *Gallardo & Associates, Inc.*, dated November 6, 2004.

*2005 First Quarterly Groundwater Monitoring Report* by *Gallardo & Associates, Inc.*, dated May 15, 2005.

#### **14.1 Geological References:**

**Geology For Planning In Sonoma County, Special Report 120, California Division of Mines and Geology, 1980.**

**Tectonic Setting of Late Miocene, Pliocene, and Pleistocene Rocks in Part of the Coast Ranges North of San Francisco Bay, California, By Kenneth F. Fox Jr., 1983. Geological Survey Professional Paper 1239.**

**Bulletin No. 118 California's Ground water, State of California. Department of Water Resources, September 1975.**

**Bulletin 118-80, Ground Water Basins in California, State of California. Department of Water Resources, January 1980.**

**Geologic Map of the Santa Rosa Quadrangle. By D.L. Wagner, and E. J. Bortugno, Map No. 2A, 1982.**

## **APPENDIX A**

### **DRILLING LOGS CROSS SECTIONS and WELL SURVEY**



DRILL RIG: 8 x 8 Portable Drill Rig DRILLING COMPANY: Clearheart Drilling, LLC		SURFACE ELEVATION: 98.51		LOGGED BY: Rafael Gallardo			
DEPTH TO INITIAL GROUNDWATER: 24 ½ feet		BORING DIAMETER: 12"		DATE DRILLED: 06/13/05			
<b>LOG DESCRIPTION AND CLASSIFICATION</b>							
DESCRIPTION AND REMARKS	WATER LEVEL	SOIL TYPE	WELL DESIGN	BORING DEPTH	BLOW COUNTS	SAMPLE NUMBER	SAMPLE DEPTH
0.0 - 8" Concrete and Baserock		C/AB		1			
8" - 7' Grey, Sand, Saturated, Loose, w/strong petroleum odor. (Perched Water Zone)	↓ ↓ ↓ ↓	SP		2			
				3			
				4			
				5			
				6			
				7			
7' - 14' Grey, Clayey Sand, Wet, Medium Dense, w/strong gasoline odor. Color change to brown @ ~ 13 feet bgs, (with 45% clay content).		SC		8			
				9		DW-1-1	8 ½ - 9
				10			
				11			
				12			
				13			
				14			
14' - 20' Brown, Sandy Clay, Moist > Optimum, Stiff, w/~ 40% sand. No gasoline odor.		CL		15			
				16			
				17			
				18			
				19			
				20			
20' - B.O.H. Light Yellow-Brown, Sandstone, Dry to Moist, Poorly indurated, Highly Fractured and Weathered. Strong gasoline and solvent odor @ ~ 23 feet bgs. Small impacted zone between ~ 23 to 24 feet bgs.  Saturated @ ~ 24 ½ feet bgs.	H2O on 06/13/05	SS		21	36 50/5"	Visual Only	
				22			
				23			
				24			
				25	26 50/1"	Visual Only	
				26			
				27			
				28			
				29	50 50/3"	Visual Only	
(Continues on Next Page)							
<b>GALLARDO &amp; ASSOCIATES, INC.</b> ENVIRONMENTAL & GEOLOGICAL SERVICES P.O. BOX 430, Santa Rosa, CA 95402 (707) 537-2292 (707)537-2292 FAX				<b>EXPLORATORY BORING LOG</b>			
				Project Name: CORBIT SITE		BORING NUMBER  DW-1	
				016A.98	06/13/05		
				PROJECT NUMBER	DATE		



DRILL RIG: CME-75 DRILLING COMPANY: Clearheart Drilling, LLC		SURFACE ELEVATION: 98.51		LOGGED BY: Rafael Gallardo				
DEPTH TO INITIAL GROUNDWATER: 24 1/2 feet		BORING DIAMETER: 8"		DATE DRILLED: 06/13/05				
LOG DESCRIPTION AND CLASSIFICATION								
DESCRIPTION AND REMARKS	WATER LEVEL	SOIL TYPE	WELL DESIGN	BORING DEPTH	BLOW COUNTS	SAMPLE NUMBER	SAMPLE DEPTH	
(Continued From Previous Page)  20' - B.O.H. Light Yellow-Brown, Sandstone, Dry to Moist, Poorly indurated, Highly Fractured and Weathered. Strong gasoline and solvent odor @ ~ 23 feet bgs. Small impacted zone between ~ 23 to 24 feet bgs.  Saturated @ ~ 24 1/2 feet bgs.		SS		31				
				32				
				33				
				34				
				35				
				36		34 50/3"	Visual Only	
				37				
				38				
				39				
				40		27 50/5"	Visual Only	
				41				
				42				
				43				
				44				
				45				
				46				
				47				
		48						
		49						
		50			17 31 28	Visual Only		
		51						
Bottom of Hole 51 1/2 Feet				52				
				53				
				54				
				55				
				56				
				57				
				58				
				59				

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	Project Name: CORBIT SITE	
	016C.98	06/13/05
	PROJECT NUMBER	DATE

BORING NUMBER

DRILL RIG: CME-75 DRILLING COMPANY: Clearheart Drilling, LLC		SURFACE ELEVATION: 96.82		LOGGED BY: Rafael Gallardo			
DEPTH TO INITIAL GROUNDWATER: 12 feet		BORING DIAMETER: 12"		DATE DRILLED: 06/14/05			
<b>LOG DESCRIPTION AND CLASSIFICATION</b>							
DESCRIPTION AND REMARKS	WATER LEVEL	SOIL TYPE	WELL DESIGN	BORING DEPTH	BLOW COUNTS	SAMPLE NUMBER	SAMPLE DEPTH
0.0 - 6" Concrete and Baserock 6" - 12' Grey-Brown, Sand, Moist to Saturated, Loose. (Perched Water Zone)  Brown color change @ ~ 7 feet bgs		C/AB SP		1 2 3 4 5 6 7 8 9 10 11 12			
12' - B.O.H. Brown, Clayey Sand, Wet to Saturated, Loose to Medium Dense, w/~ 10% clay content).	H2O on 06/14/05 	SC		13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29			
(Continues on Next Page)							

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 (707)537-2292 FAX

EXPLORATORY BORING LOG	
Project Name: CORBIT SITE	
016A.98	06/14/05
PROJECT NUMBER	DATE


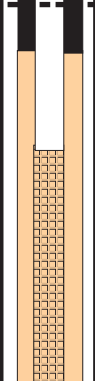
BORING NUMBER  

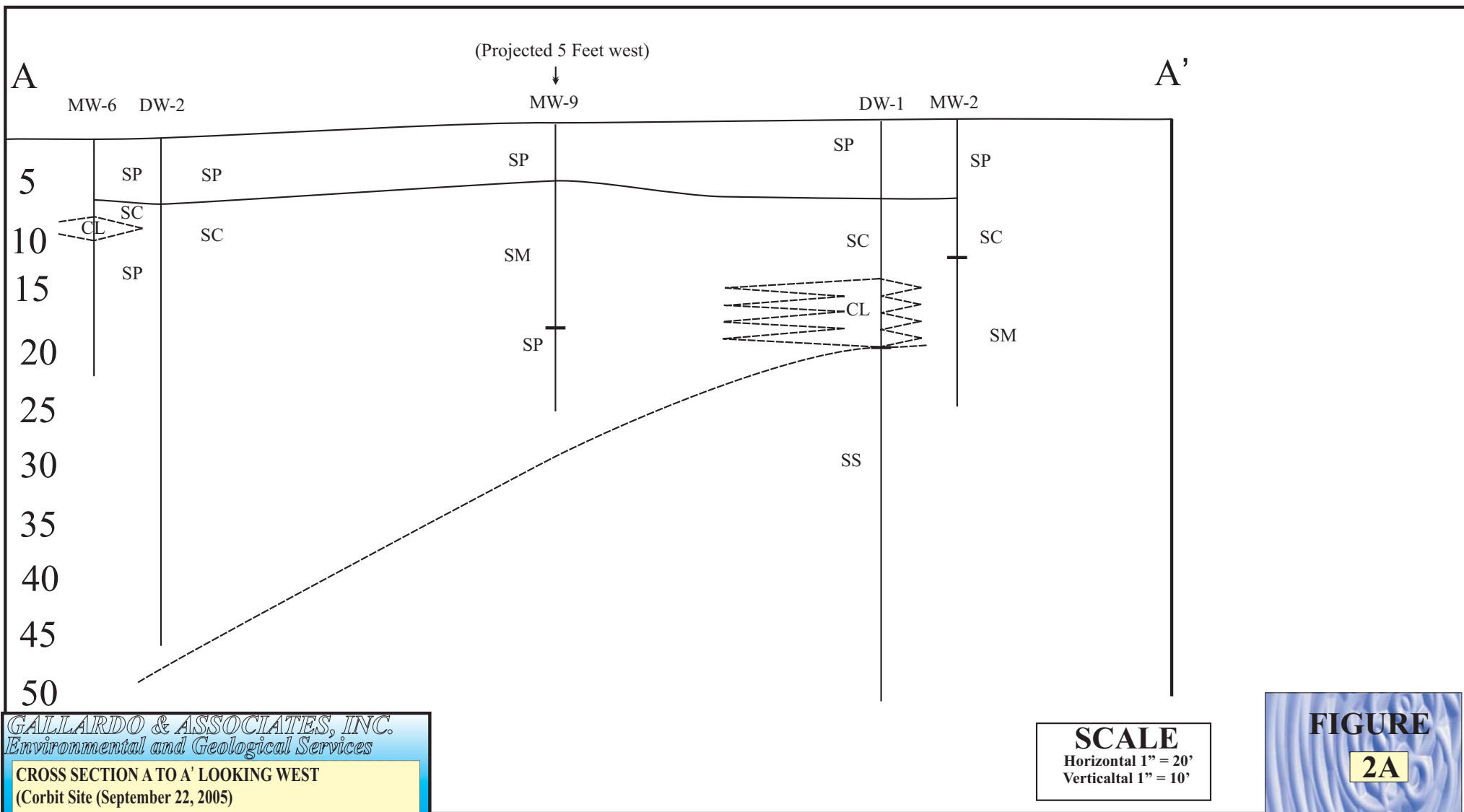
DW-2

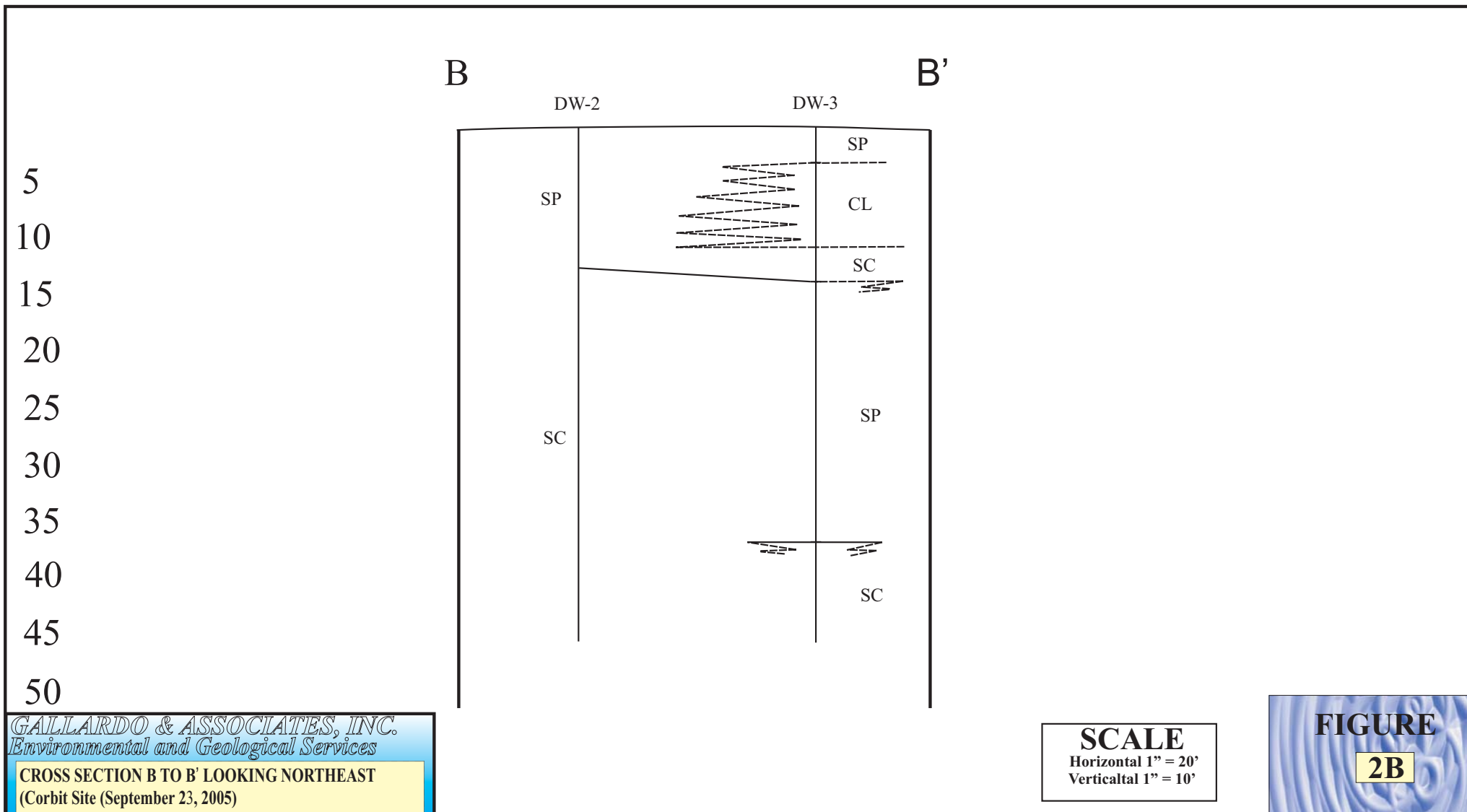
[illegible]

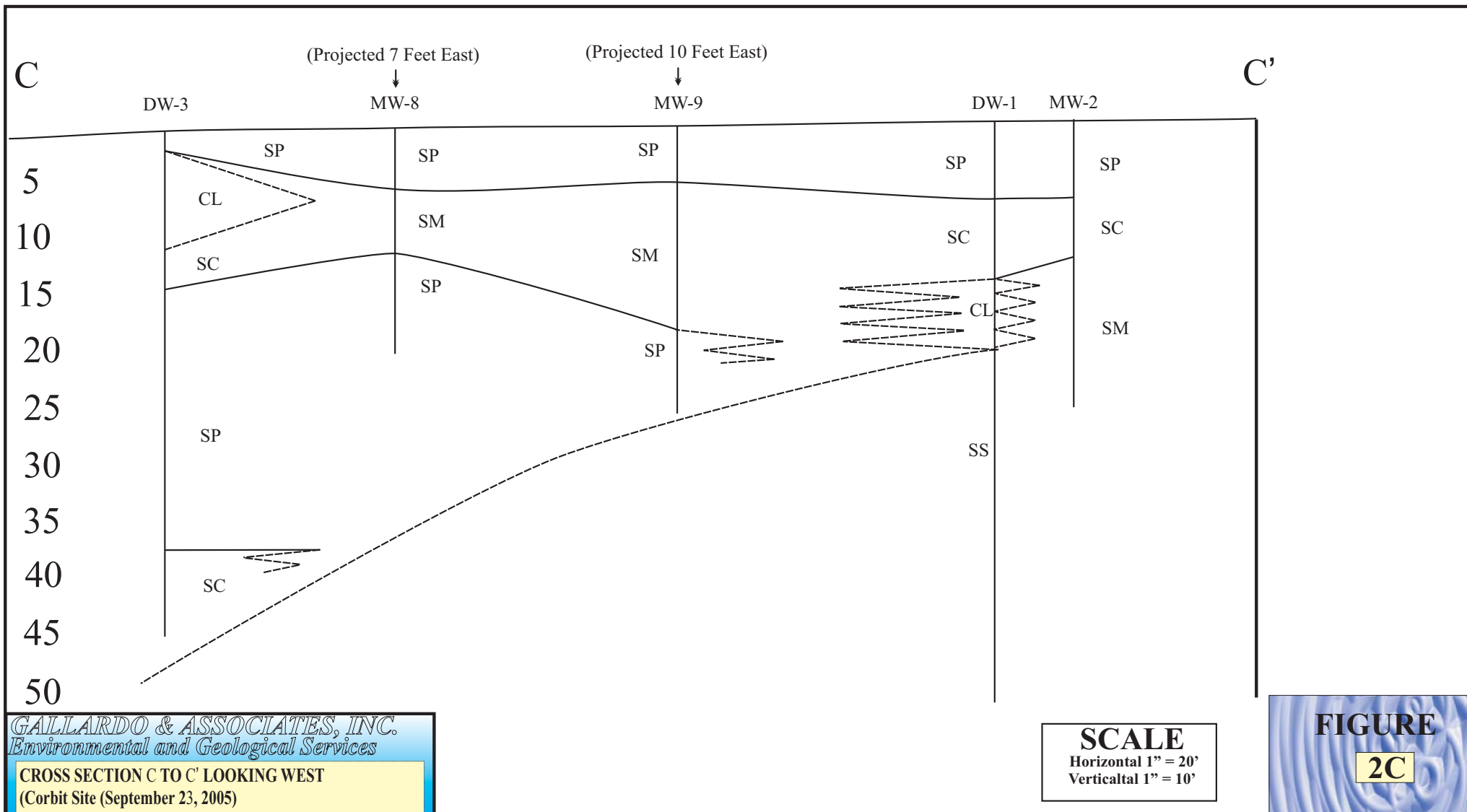
DRILL RIG: CME-75 DRILLING COMPANY: Clearheart Drilling, LLC		SURFACE ELEVATION: 97.69		LOGGED BY: Rafael Gallardo			
DEPTH TO INITIAL GROUNDWATER: 14 feet		BORING DIAMETER: 12"		DATE DRILLED: 06/15/05			
LOG DESCRIPTION AND CLASSIFICATION							
DESCRIPTION AND REMARKS	WATER LEVEL	SOIL TYPE	WELL DESIGN	BORING DEPTH	BLOW COUNTS	SAMPLE NUMBER	SAMPLE DEPTH
0.0 - 1 1/2' Baserock		AB		1			
1 1/2' - 3 1/2' Grey-Brown, Sand, Moist, Loose to Medium Dense, w/debris, (sparkplugs, plastic, glass, nails, etc.). (Perched Water Zone)	↓ ↓ ↓ ↓	SPI	↓ ↓ ↓ ↓	2 3	11 10 19	Visual Only	
3 1/2' - 11' Yellow-Brown, with Grey, Sandy Clay, Moist, Stiff, w/~ 35% sand content.  Brown color change @ ~ 7 feet bgs		CL		4 5 6 7 8 9 10 11			
11' - 14' Brown, Clayey Sand, Moist > Optimum, Medium Dense, w/~ 30% clay content.	H2O on 06/15/05 ◆	SC		12 13 14			
14' - 37' Brown, Sand, Saturated, Dense.		SP		15 16 17 18 19 20 21 22 23 24 25 26 27 28 29			
(Continues on Next Page)							

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		Project Name: CORBIT SITE		BORING NUMBER <div>DW-3</div>
		016A.98	06/15/05	
		PROJECT NUMBER	DATE	

DRILL RIG: CME-75 DRILLING COMPANY: Clearheart Drilling, LLC		SURFACE ELEVATION: 97.69		LOGGED BY: Rafael Gallardo			
DEPTH TO INITIAL GROUNDWATER: 14 feet		BORING DIAMETER: 8"		DATE DRILLED: 06/15/05			
LOG DESCRIPTION AND CLASSIFICATION							
DESCRIPTION AND REMARKS	WATER LEVEL	SOIL TYPE	WELL DESIGN	BORING DEPTH	BLOW COUNTS	SAMPLE NUMBER	SAMPLE DEPTH
(Continued From Previous Page)  14' - 37' Brown, Sand, Saturated, Dense.		SP		31 32 33 34 35 36 37	28 45 33	Visual Only	
37' - B.O.H. Light Brown, Clayey Sand, Saturated, Medium Dense, w/ ~ 10% clay content).		SC		38 39 40 41 42 43 44 45	7 12 17	Visual Only	
Bottom of Hole 45 Feet				46 47 48 49 50 51 52 53 54 55 56 57 58 59			
<b>GALLARDO &amp; ASSOCIATES, INC.</b> ENVIRONMENTAL & GEOLOGICAL SERVICES P.O. BOX 430, Santa Rosa, CA 95402 (707) 537-2292 (707)537-2292 FAX			EXPLORATORY BORING LOG				
			Project Name: CORBIT SITE				<b>BORING NUMBER</b>  DW-3
			016A.98		06/15/05		
			PROJECT NUMBER		DATE		









## **APPENDIX B**

### **LABORATORY ANALYTICAL DATA**